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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/338,045	06/22/1999	MARTIN JOHN TROTTER	UK998092	9881

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VIENNA, VA 22182-3817

EXAMINER

PARDO, THUY N

ART UNIT	PAPER NUMBER
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2175

DATE MAILED: 05/20/2004

19

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

09/338,045

Applicant(s)

TROTTER, MARTIN JOHN

Examiner

Thuy Pardo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 March 2004 and 28 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 31, 32 and 38-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 31 and 32 is/are allowed.
- 6) ☒ Claim(s) 38-40 and 42 is/are rejected.
- 7) ☒ Claim(s) 41 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

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DETAILED ACTION

1. Applicant's RCE filed on March 31, 2004 and Personal Interview on April 28, 2004 in response to the Examiner's Office Action has been reviewed. Claims 1-30 and 33-37 have been canceled, claims 38 and 40 have been amended.
2. Claims 31, 32, and 38-42 are presented for examination.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 38-40 and 42 are rejected under 35 U.S.C. § 103 (a) as being unpatentable over **Ungar et al.** (Hereinafter "Ungar") US Patent No. 6,314,436, in view of **Wilson** in "Uniprocessor Garbage Collection Techniques".

As to claim 38, Ungar teaches the invention substantially as claimed, comprising:
retrieving an object pointer structure from the thread stack [ab];
extracting, from the object pointer structure, a reference to its corresponding object and a reference to a next object pointer structure [col. 9, lines 8-45; col. 12, lines 31 to col. 13, lines 28];

performing said retrieving and said extracting with respect to a next, subsequent and last object pointer structures, whereby the retrieved object references identify a root set of objects within the memory [fig. 7a; col. 20, lines 30-59].

However, Ungar does not explicitly teach reclaiming the memory not used by the root set of objects. Wilson teaches reclaiming the memory not used by the root set of objects [“reclaim the garbage”, see page 9 and fig. 2 on page 7].

Therefore, it would have been obvious to one of ordinary skill in the Data Processing art at the time of the invention to have modified the system of Ungar wherein traversing the pointers carried thereby to determine the objects linked to the root objects provided thereof would have incorporated the teachings of Wilson especially reclaiming spaces of unmarked objects; the motivation being to expand and enhance the Ungar’s system by allowing the garbage collector to recover memory used by objects no longer in use by the operating system and application programs in the computer system.

As to claim 39, Ungar and Wilson teach the invention substantially as claimed as specified in claim 38 above. Wilson further teaches compacting the root set of objects so that they are contiguous in memory and updating all object pointers and references in the thread stack [2.4.1, pages 10-11].

As to claim 40, Ungar and Wilson teach the invention substantially as claimed as specified in claim 38 above. Ungar further teaches storing object pointers structures in a thread stack, each object pointer comprising a reference to an object and a reference to a subsequent object pointer in the thread stack such that the object pointer structures are a linked list and identify a root set of objects [ab; col. 9, lines 22-45], and Wilson further teaches identifying all

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objects referenced directly or indirectly by the root set objects [“reclaim the garbage”, see page 9 and fig. 2 on page 7].

As to claim 42, all limitations of this claim have been addressed in the analysis of claim 39 above, and this claim is rejected on that basis.

Allowable Subject Matter

4. Claims 31 and 32 are allowed over the prior art of record.

The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record fails to teach or suggest individually or in combination the feature of “storing a variable pointing to the previously stored object data structure at the top of the stack, using the variable when storing a new object data structure, and updating the variable with the new object data structure reference” as set forth in the independent claim 31.

Claim 32 being further limiting to claim 31 is also allowed.

Claim 41 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As to claim 41, the feature of “storing a variable referencing to the last stored object pointer; using the variable when storing a new object pointer; and updating the variable with the new object pointer reference”, taken together with other limitations of claim 40 was not disclosed by the prior art of record.

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5. Applicant's arguments on April 28, 2004 with respect to claims 38-40 and 42 have been considered but are moot in view of the new ground(s) of rejection.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thuy Pardo, whose telephone number is (703) 305-1091. The examiner can normally be reached Monday through Thursday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dov Popovici, can be reached at (703) 305-3830. The fax phone number for the organization where this application or proceeding is assigned are as follows:

(703) 872-9306 (Official Communication)

and/or:

(703) 746-5616 *(Use this Fax#, only after approval by Examiner, for "INFORMAL" or "Draft" communication. Examiner may request that a formal/amendment be faxed directly to then on occasions).*

Any inquiry of a general nature of relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-3900.

7. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

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or faxed to:

(703) 308-9051, (for formal communications intended for entry)

Or:

(703) 308-5359, (for informal or draft communications, please label

"PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA., Sixth Floor (Receptionist).

May 14, 2004

A handwritten signature in black ink, appearing to be 'THUY N. PARDO', with a long horizontal line extending to the right.

**THUY N. PARDO
PRIMARY EXAMINER**